4813 Ö REFERENCE

B

#### STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS** GEOTECHNICAL ENGINEERING UNIT

#### **CONTENTS**

SHEET NO.	<b>DESCRIPTION</b>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4	PROFILE
5 TO 6	BORE LOGS
7	LABORATORY TESTING SUMMARY
8	SITE PHOTOGRAPHS

## **STRUCTURE** SUBSURFACE INVESTIGATION

COUNTY _		SAMPSON													
PROJECT	DE:	CRIP	TION	B	RIDGE	NO.	810	018	ON	SR	1004				
(EDMO															
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STATE PROJECT REFERENCE NO. 8 B-4813

#### **CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABDRATORY SAMPLE DATA AND THE IN SITU (IM-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISTY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:

  1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.

  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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NOVEMBER 2018





SIGNATURE

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED** 

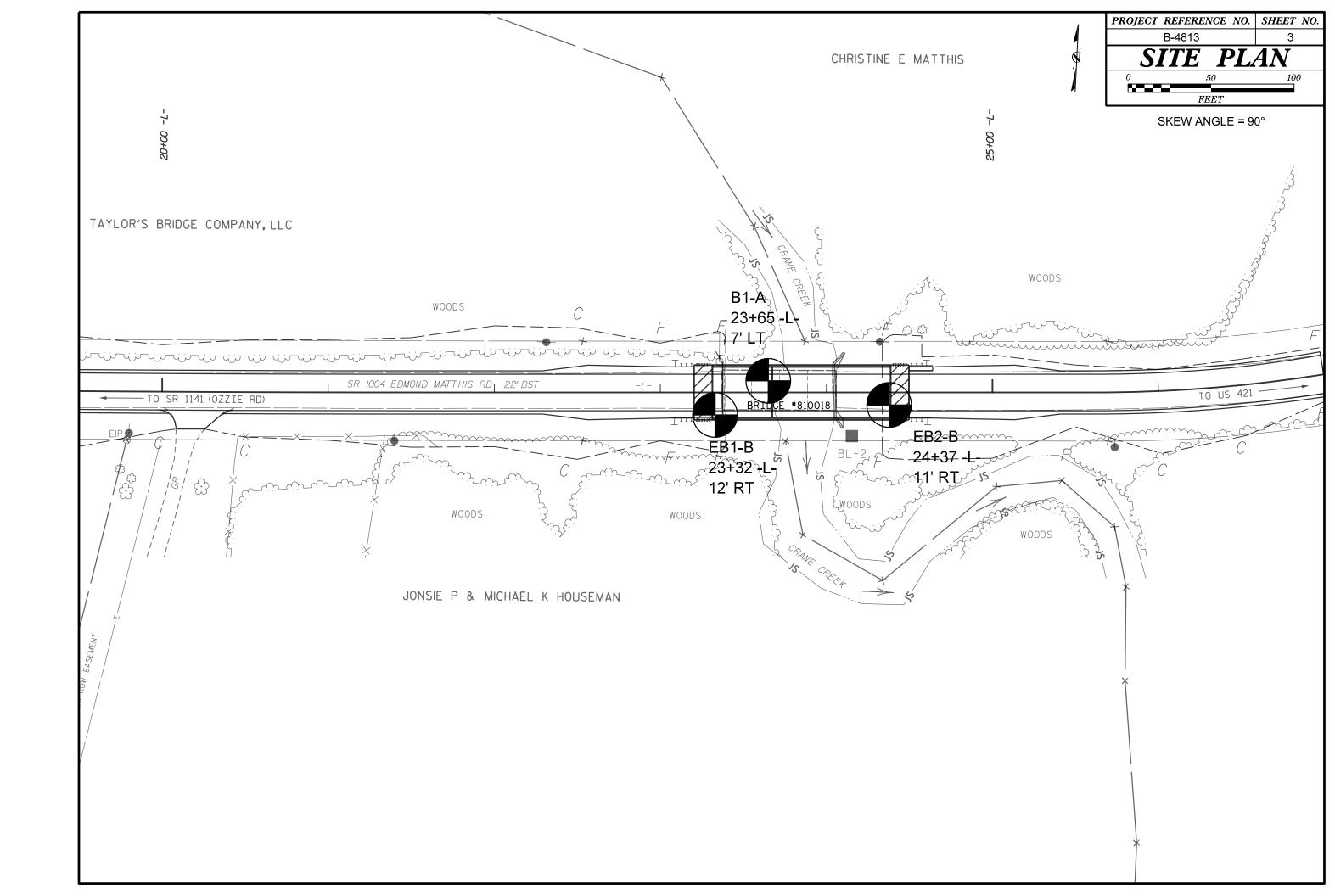
PROJECT REFERENCE NO. SHEET NO. 2

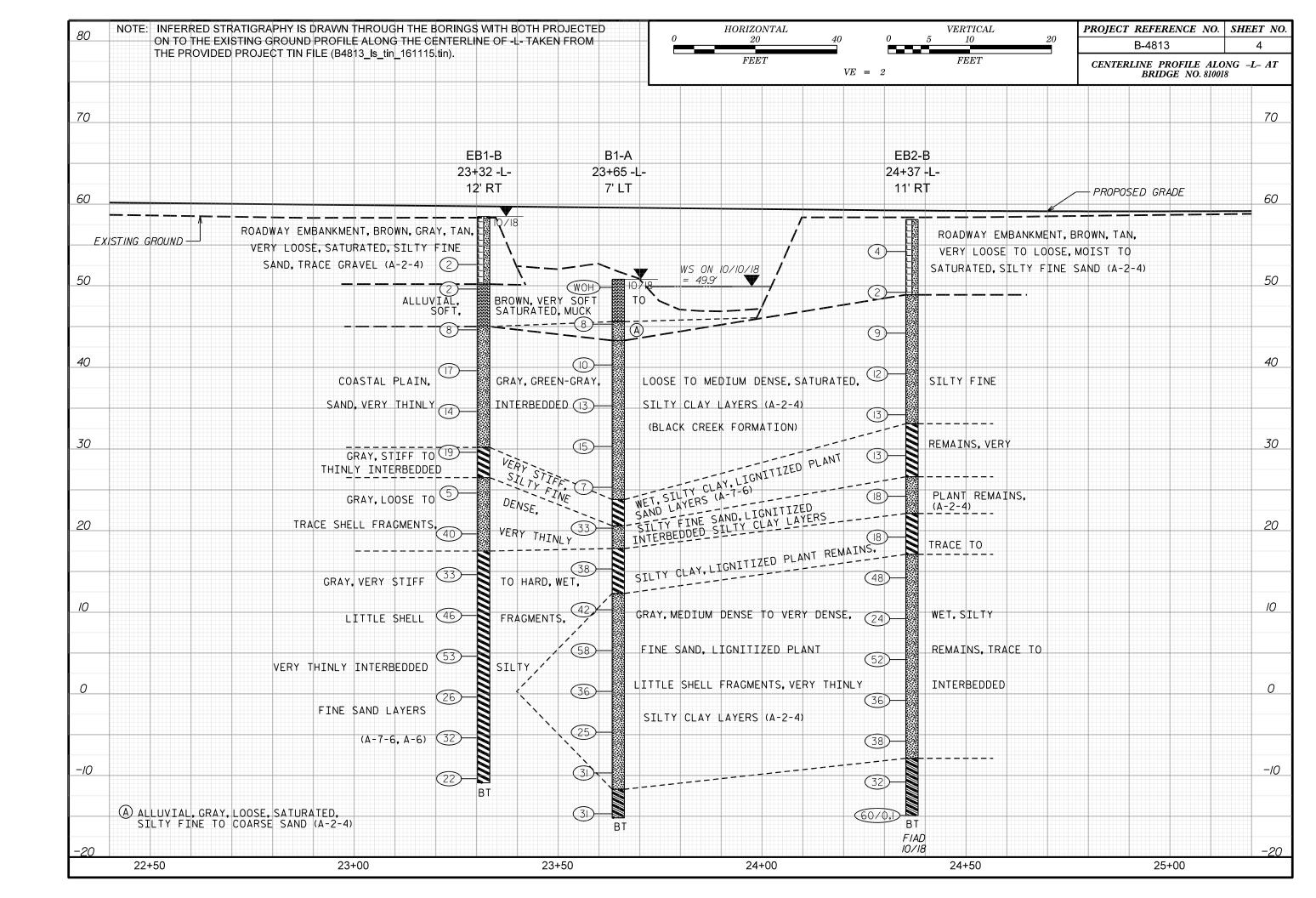
# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

# SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN Ø1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.  ADUIFER - A WATER BEARING FORMATION OR STRATA.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	ANGULARITY OF GRAINS	REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	WEATHERED WISON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.  MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS  CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE CRYSTALLINE WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CH) GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-6 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPIT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 d0000 SYMBOL 0000 SYMBOL	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK STATE SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*18 58 MX   GRANULAR   SILT- MUCK, CLAY   PEAT	PERCENTAGE OF MATERIAL	CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*200   15 Mx   25 Mx   10 Mx   35 Mx   35 Mx   35 Mx   35 Mx   36 Mn	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
MATERIAL PASSING *40	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	HORIZONTAL.
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR HIGHLY PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN MODERATE ORGANIC	MODERATELY ORGANIC         5 - 10%         12 - 20%         SOME         20 - 35%           HIGHLY ORGANIC         > 10%         > 20%         HIGHLY         35% AND ABOVE	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALLS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX W W 4 MX 8 MX 12 MX 16 MX NU MX AMOUNTS UF ORGANIC SOILS	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO  (SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS.  OF MAJOR GRAVEL, AND SAND CRAYEL AND SAND SOILS  OF MAJOR GRAVEL, AND SAND SOILS  OF MAJOR GRAVEL AND SAND SOILS	▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING  ▼ STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU		MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN  (MOD.) GRANITOID ROCKS, MOST FELOSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 :PI OF A-7-6 SUBGROUP IS > LL - 30	-	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
CONSISTENCY OR DENSENESS  RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE COMPACTNESS UR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)  ROADWAY EMBANKMENT (RE)  STORES  DIP & DIP DIRECTION  OF ROCK STRUCTURES	<u>IF TESTED, WOULD YIELD SPT REFUSAL</u>	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
VERY LOOSE / 4	SPI CLOPE NUCLEATOR	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT  (SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	ITS LATERAL EXTENT.  LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY LOOSE 4 TO 10	SOIL SYMBOL  OPT OMT TEST BORING  SCOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL MEDIUM DENSE 10 10 30 N/A	ARTIFICIAL FILL (AF) OTHER AUGER BORING COME PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
(NON-COHESIVE) VERY DENSE > 50		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK (V SEV.) REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT         < 2         < 0.25           GENERALLY         SOFT         2 TO 4         0.25 TO 0.5	- INFERRED SOIL BOUNDARY - CORE BORING SOUNDING ROD	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY         MEDIUM STIFF         4 TO 8         0.5 TO 1.0           MATERIAL         STIFF         8 TO 15         1 TO 2	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4 HARD > 30 > 4	→ → → → ← ← ALLUVIAL SOIL BOUNDARY \( \triangle \) PIEZOMETER INSTALLATION \( \triangle \) SPT N-VALUE	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	ROCK HARDNESS	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT
U.S. STD. SIEVE SIZE 4 10 40 60 200 270		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SHALLOW STEEL OF USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY (BLDR.) (COB.) (GR.) (SE.) (CL.)	UNDERCUT ACCEPTABLE DEGRADABLE ROCK	TO DETACH HAND SPECIMEN.  MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(USE, SU.) (F SU.)	ABBRE VIATIONS  AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	OR SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE)(SPT) - NUMBER OF BLOWS (N OR BPF) OF
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL
SOIL MOISTURE - CORRELATION OF TERMS	CL CLAY MOD MODERATELY $\gamma$ - UNIT WEIGHT CPT - CONE PENETRATION TEST NP - NON PLASTIC $\gamma_a$ - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC  DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
(SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO   SD SAND, SANDY   SS - SPLIT SPOON   F - FINE   SL SILT, SILTY   ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(P) ATTAIN OPTIMUM MOISTURE	FRAGS FRAGMENTS	FRACTURE SPACING BEDDING	BENCH MARK: BL-2 (N: 402717.041; E: 2218881.844)
	EQUIPMENT USED ON SUBJECT PROJECT	TERM SPACING TERM THICKNESS  VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	ELEVATION: 55.49 FEET
OM — OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	
SL _ SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
- DRY - (D) ATTAIN OPTIMUM MOISTURE	CME-55 G* CONTINUOUS FLIGHT AUGER CORE SIZE:	THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	8" HOLLOW AUGERS	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH	CME-550 HARD FACED FINGER BITS	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT	VANE SHEAR TEST UNGCARBIDE INSERTS	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH	X CASING W/ ADVANCER POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;	
COLOR	PORTABLE HOIST X TRICONE 215/6 STEEL TEETH HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
	X ACKER RENEGADE TRICONE 'TUNGCARB. SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	ACRE HENELABLE CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
The state of the s		SAMPLE BREAKS ACROSS GRAINS.	







#### GEOTECHNICAL BORING REPORT BORE LOG

	ulting Eng		nd Sci	entists					ORE					<u></u>				
WBS	17BP.	3.R.78			Т	<b>IP</b> B-4813	3	COUNT	Y SAMP	SON	1			GEOLOGIS	ST BUNCH,	C.M.	1	
SITE	DESCR	IPTION	BRIE	DGE N	O. 81	0018 ON S	R 1004 (ED	MOND M	ATTHIS F	ROAI	D) OVE	R CR/	ANE C	CREEK		GROUN	D WTR (f	
BORI	NG NO.	EB1-l	3		s	TATION :	23+32		OFFSE	Г 1:	2 ft RT			ALIGNMEN	NT -L-	0 HR.	N/	
COLI	LAR ELE	<b>EV.</b> 58	.5 ft		Т	OTAL DEF	<b>PTH</b> 69.4 f	t	<b>NORTHING</b> 402,727					EASTING	2,218,798		24 HR.	0.
DRILL	. RIG/HAN	MER EF	F./DAT	E TER	R92-0 A	CKER RENE	GADE 95% 0	2/24/2018			DRILL N	IETHOI	) Mu	d Rotary		HAMM	ER TYPE	Automatic
DRIL	LER D	UGGIN	S, W.	T.	s	TART DAT	E 10/09/1	8	COMP.	DAT	<b>E</b> 10/0	09/18		SURFACE	WATER DEF	TH N/	'A	
ELEV	DRIVE ELEV	DEPTH		W CO		1		PER FOOT			SAMP.	<b>V</b> /			SOIL AND RO	CK DES	CRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 1	00	NO.	<u>/мо</u>		ELEV. (ft)				DEPTH
60		-												-				
	-	<b>!</b>				<del>                                     </del>				-				- 58.5 -	ROADWAY	D SURF		
E E	-	‡								-				BR	OWN, GRAY, SAND, TF	AND TAN	N, SILTY FI RAVEL	NE
55	53.6 -	4.9				<del>                                   </del>		1	<del>                                     </del>	-				<del>-</del>	G 12,			
	-	-	1	1	1	•2 · · ·				:		Sat.		=				
50	50.6	7.9	1	1	1	-     <u>                                </u>				•		l w		50.2	A1	1111/141		
	-	‡				T2			.	:		''	****	- -		<b>LUVIAL</b> VN, MUC	CK	
	- 45.6 -	12.9							.				XXXX	<u>.</u>				
45	45.0	12.9	4	4	4	<del>  •</del> 8	<del>                                     </del>	<u> </u>		_		w		45.0	COAS	TAL PLA	NN	1;
	-	-								-					AY, SILTY FINE TERBEDDED			
40	40.6	17.9	6	7	10	] :::;;				-		l			(BLACK CRE			
	-	Ŧ	0	′	10	1	7			-		W		-				
	-	‡				:::::::::::::::::::::::::::::::::::::				-				-				
35	35.6 -	22.9	6	6	8	1				-		w		-				
	-	‡				$   :: \mathcal{T}$				-				-				
20	30.6 -	27.9				:: : j				:				30.2				2
30	-	-	5	9	10	] <del>  )</del>	19			_		W		GR/	AY, SILTY CLA			NT
	-	‡				: :/:				-				- KEN - 26.5	MAINS, VERY 1 SILTY FINE			)ED 32
25	25.6	32.9	2	2	3	<b>┤</b> [_/				•		W		- GF	RAY, SILTY FIN PLANT REMAI			ΞD
	-	ł				<b>■</b> 5				-		**		-	FRAGMENT TERBEDDED	S, VERY	THINLY	
	- 20.6 -	37.9								-				- -	II EKDEDDED	SILITU	LATLATER	(3
20		37.9	14	20	20	1	40	<u> </u>		_		w		_				
	-	-					.  /			-				- <u>17.5</u>	~~~~~~~			<u> </u>
15	15.6	42.9	12	15	18	] :::::	.   : / : :			-					AY, SILTY CLA EMAINS, TRAC	E TO LI	TTLE SHEL	
	-	F	12	13	10		33			-	SS-3	43%		- · I	FRAGMENT INTERBEDDEI	SILTY		)
	-	Ī.,								-				-	L	AYERS		
10	10.6	47.9	10	11	35	1		946		_		w		<u> </u>				
	-	‡					:   : : : :	\[``````		-				- -				
5	5.6 -	52.9				] :::::		<b>\</b> :::::		-								
<u> </u>	-	‡	14	22	31			53		-		W		-				
	-	‡					:   : : ;/.			:				- -				
0	0.6	57.9	9	11	15	<b>┤</b> │	· / · · ·			-		l w		- -				
	-	‡					1 120			-				<del>.</del> =				
_	-4.4 <del>-</del>	62.9				] ::::			.					<u>.</u>				
-5	_	†	9	13	19		32	<del> </del>		_		W		<u>-</u>				
	-	‡					: [/: : : :		.	:			1	<u>-</u> -				
-10	-9.4 -	67.9	6	8	14	<u> </u>	<u>/</u>			•		w						
		<del>                                     </del>	<u> </u>	Ť	- · ·	<del>                                     </del>	<b>▼</b> 22					V V		-10.9 Bor	ing Terminated	at Eleva	ation -10.9 f	t IN
	_	†											[	_ CC	DAŠTAL PLAIN CREEK I			CK
	_	<u> </u>												_ . ELE	EVATION OF V	VATER E	EXCESSIVE	LY
	_	ł													H DUE TO HU			
	-	F												-	(0	J. 20 10)		

#### GEOTECHNICAL BORING REPORT BORE LOG

SHEET 5 OF 8

									ORE	L	UG							
WBS	17BP.	3.R.78			TI	IP B-4813	<b>I</b>	COUNT	Y SAMPS	108	N			GEOLOGIST	BUNCH,	C.M.		
SITE	DESCR	IPTION	BRID	OGE N	O. 810	0018 ON S	R 1004 (ED	MOND M	ATTHIS RO	AC	D) OVE	R CRA	ANE C	REEK			GROUN	D WTR (ft)
BOR	ING NO.	B1-A			S	TATION 2	23+65		OFFSET	7	ft LT			ALIGNMENT	' -L-		0 HR.	N/A
COL	LAR ELE	<b>EV.</b> 50	.8 ft		T	OTAL DEF	<b>TH</b> 66.0 f	t	NORTHIN	١G	402,74	18		EASTING 2	,218,830		24 HR.	0.0
DRILL	RIG/HAN	MER EF	F./DATI	E TER	92-0 A	CKER RENE	GADE 95% 0.	2/24/2018	<u> </u>					d Rotary		HAMMI	ER TYPE	Automatic
DRIL	<b>LER</b> D	UGGIN	S, W.	T.	S <sup>-</sup>	TART DAT	E 10/09/1	8	COMP. D	PΑT	Γ <b>E</b> 10/0	9/18		SURFACE W	ATER DEF	TH N/	4	
ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT		BLOWS	PER FOO	Т		SAMP.	$\overline{ullet}/$	L	SO	OIL AND RO	CK DESC	CRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0	25	50	75 10	00	NO.	<u>/MOI</u>		ELEV. (ft)	31271112110			DEPTH (ft)
55		_												_				
	-	<u> </u>											l ⊧					
	50.8 -	0.0										lacksquare		50.8	GROUN		ACE	0.0
50	-		WOH	WOH	WOH	0	<u> </u>	1				W	****	-		LUVIAL VN, MUC	K	
						\:\::::			.   .				****			,		
45	46.3	4.5	1	4	4							Sat.	****	45.6 GPAN	, SILTY FIN	E TO CC	ADSE SAI	5.2
	-	[				1 . [								43.3				7.5
	41.3	9.5					: : : :						F	GRA'	COAS Y, SILTY FIN	<b>TAL PLA</b> E SAND		ĒD
40	_	-	3	5	5	10_	+				SS-4	Sat.	L E		ANT REMAI			RS
	-	F				:::::::::::::::::::::::::::::::::::::			.				F	(	BLACK CRE	EK FOR	MATION)	
35	36.3	14.5	5	6	7				.			Sat.						
	-	F												-				
	31.3	19.5				::;:			.									
30	_	-	4	6	9	15	4			-		W		-				
	-	ļ				::/::			.									
25	26.3	24.5	3	3	4	$\{  :_{I'}::$			.			W						
25	-	‡				7	1	: : : :				vv		23.8				27.0
	21.3	29.5				:::`			·   · · · · ·					GRAY	, SILTY CLA RE	Y, LIGNI MAINS	TIZED PLA	NT
20		29.5	9	14	19	1	33					W			Y, SILTY FIN	F SAND	TIGNITIZI	<u>30.2</u>
	-	<u> </u>				::::	:: /::		.					17.8	PLANT	REMAIN	1S 	33.0
	16.3	34.5	6	13	25	::::	/		.   .						, SILTY CLA INS, VERY T			
15	-	<u> </u>	0	'	20					_		W		-	SILTY FINE	SAND L	AYERS	
	-					: : : :	: :   :		.   .					12.3	Y, SILTY FIN			38.5
10	11.3	39.5	11	20	22	1	42					W		PLA	NT REMAINS	S, TRACE	TO LITTI	.E
	-	<u> </u>						\	.   .				_		LL FRAGME RBEDDED S			
	6.3	44.5	14	25	22	: : : :		\\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	.   .				<u> </u>					
5		<u> </u>	14	25	33		+	<b>●</b> 58	+	+	SS-5	W		-				
		<u> </u>				[]::::	1::::	1 : : : :	.   .				::: <u> </u>					
0	1.3	49.5	10	16	20		36	ļ				W		_				
	-	<u> </u>					17.		.	1			IIII F					
	-3.7	54.5			10	: : : :	/		.				l::::F					
-5		<u> </u>	9	9	16		25	+		$\dashv$		W	:::F	-				
	-	Ĺ				[]::::	<u>/</u>		.   : : : :				li:ii-					
-10	-8.7	59.5	12	12	19		31					W	II.					
	-	F					7			7				- _ <u>-11.7</u>				62.5
	-13.7	64.5				] ::::			:   : : : :					GRAY,	FINE SAND	Y CLAY, GMENTS		HELL
-15		<u> </u>	7	12	19	<u> </u>	31	1				W		15.2	Terminated	at Eloup	tion -1F 2 f	66.0
	-	Ī											F		TAL PLAIN	SANDY (	CLAY (BLA	
	-	F											F		CREEK F		•	
	-	F											F		ATION OF W DUE TO HU	RRICAN		
	-	F													(09	9/2018)		
		I																





### GEOTECHNICAL BORING REPORT BORE LOG

SHEET 6 OF 8

	ulting Eng						В	ORE L	.OG					
WBS	17BP.	3.R.78			TI	<b>IP</b> B-4813	COUNT	Y SAMPSO	N			GEOLOGIST BUNCH, C.M.		
SITE	DESCR	IPTION	BRID	DGE N	O. 810	0018 ON SR 1004 (E	REEK	GROUND	WTR (ft)					
BOR	ING NO.	EB2-I	3		S	<b>TATION</b> 24+37		OFFSET	11 ft RT			ALIGNMENT -L-	0 HR.	N/A
COL	LAR ELI	<b>EV.</b> 58	3.1 ft		T	OTAL DEPTH 73.0	ft	NORTHING	402,7	33		<b>EASTING</b> 2,218,903	24 HR.	FIAD
DRILL	_ RIG/HAN	MER EF	F./DAT	E TER	892-0 A	CKER RENEGADE 95%	02/24/2018		DRILL N	1ETHOD	Mu	d Rotary HAM	MER TYPE AL	utomatic
DRIL	. <b>LER</b> D	UGGIN	S, W.	T.	S <sup>-</sup>	TART DATE 10/10	/18	COMP. DA	<b>TE</b> 10/	10/18		SURFACE WATER DEPTH	√A	
ELEV	DRIVE ELEV	DEPTH	BLC	w co	UNT	4	S PER FOOT	-	SAMP.	lacksquare	L	SOIL AND ROCK DE	SCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI	Ğ	ELEV. (ft)		DEPTH (f
60	_	1									L	-		
		<u> </u>				<del>                                     </del>	<del>. ,</del>	<del>                                     </del>			<u> </u>	58.1 GROUND SUR		0
EE	55.2	29				;::: :::						BROWN AND TAN, SIL		)
55	55.2_	- 2.9	2	2	2	<b>↑</b>	<del>-  </del>	1	SS-1	м		-		
	:	‡				:::: :::				[				
50	50.2	7.9	WOH	WOH	2	-   <u>                                  </u>			00.0			-		
		‡	WOII	WOII	^	2			SS-2	Sat.		48.9 COASTAL PL		9
		<u> </u>				'						GREEN-GRAY, SILTY FII THINLY INTERBEDDEI		
45	45.2	12.9	3	5	4	1 . 9	<del>-  </del>	+		Sat.		- LAYERS (BLACK CREEK FO		
	-	<u> </u>				:\:: :::	-					(==::::==:::=		
40	40.2	17.9				. 1						_		
	-	ł	3	5	7	12				Sat.				
		ł				::\:: :::								
35	35.2	22.9	5	6	7			+		l w	I	-		
	-	Ŧ					.						CLAY	25
30	30.2	27.9									V	3.3.1, 3.2.1	J	
-00		-	4	6	7	13-				w		-		
	-	‡				::;::::::::::::::::::::::::::::::::::						_26.6		31
25	25.2	32.9	5	7	11	1				l w		GRAY-GREEN, SILTY - LIGNITIZED PLANT RE		Ē
	:	‡				· · · • 18 · · · ·     · · · ·     · · · ·     · · · · ·     · · · · ·     · · · · ·   · · · · ·   · · · · · ·   ·				**	-	SHELL FRAGMENTS, 22.1 INTERBEDDED SILTY		36
20	20.2	37.9									S	GRAY, SILTY CLAY, SO SHELL FRAGMENTS,	ME TO TRACE	=
20	- 20.2 _	37.9	6	8	10	• 18		1		w		INTERBEDDED SILTY	FINE SAND	
	-	‡										LAYERS 		41
15	15.2	42.9	18	23	25	. ,						LIGNITIZED PLANT RE	MAINS, TRAĆE	<b>=</b>
	:	‡	10	23	25		. <b>9</b> 48 .			W		SHELL FRAGM	ENIS	
						:::: :,/:					::::‡			
10	10.2	47.9	9	13	11	24				w	-	-		
	-	<u> </u>				::::[`\::	-				-			
5	5.2	52.9	10								-	_		
	-	ŀ	13	20	32		52			W	_			
	-	-					/							
0	0.2	57.9	9	14	22	•36		+		l w	F	-		
	-	Ŧ					.				Į.			
-5	-4.8	62.9				] :::: ::/:				[				
	] -	F	9	15	23		3-			w	::: <b> </b>	-		
	-	Ŧ				:::: :/:						<u>7.9 GRAY, FINE SANDY</u> (	LAY TRACE	66
-10	-9.8	67.9	13	12	20	- /				l w		SHELL FRAGMENTS, INTERBEDDED SILTY	VERY THINLY	•
	-	‡				32.				**		IINI EKDEUDED SILIY	JAINU LAYEKS	,
	140	72.9								[		-14.9		70
	-14.8_	72.9	60/0.1			<u> </u>		60/0.1	+		7	Boring Terminated w		73
	:	‡									F	Penetration Test Refusal a ft IN COASTAL PLAIN	SANDY CLAY	ł. <del>9</del>
	-	+									F	(BLACK CREEK FO	RMATION)	

#### LABORATORY TESTING SUMMARY

PROJECT NUMBER:	17BP.3.R.78	OUNTY:	SAMPSON
-		_	

DESCRIPTION: BRIDGE NO. 810018 ON SR 1004 (EDMOND MATTHIS ROAD) OVER CRANE CREEK

			0111	Depth	AAGUTO				% by W	eight		%	%	Passing (sie	ves)		0/
Sample No.	Alignment	Station	Offset (feet)	Interval (feet)	AASHTO Class.	L.L.	L.L. P.I.		Fine Sand Silt		Clay	Retained #4 Sieve	#10	#40 #20		% Moisture	% Organic
SS-1	-L-	24+37	11 RT	2.9 - 4.4	A-2-4 (0)	14	NP	50.7	37.2	4.5	7.6	0	98	70	14		
SS-2	-L-	24+37	11 RT	7.9 - 9.2	A-2-4 (0)	18	NP	4.3	78.2	7.5	10.0	0	100	100	21		
SS-3	-L-	23+32	12 RT	42.9 - 44.4	A-7-6 (33)	72	57	16.5	22.3	11.2	50.0	0	100	98	63	43.1	
SS-4	-L-	23+65	7 LT	9.5 - 11.0	A-2-4 (0)	21	NP	23.0	61.0	5.8	10.2	0	100	97	17		
SS-5	-L-	23+65	7 LT	44.5 - 46.0	A-2-4 (0)	20	NP	30.4	56.2	6.1	7.3	0	99	87	15		
								+									
				1													
								+									
														1			
								1									
			<u> </u>														

NP - NON-PLASTIC

Stephanie H. Huffman
Certified Lab Technician Signature

114-01-1203 Certification Number

#### PROJECT REFERENCE NO.

B-4813

# BRIDGE NO. 810018 SITE PHOTOGRAPHS



END BENT 2 (-L-) LOOKING SOUTHWEST



END BENT 2 (-L-) LOOKING WEST